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CANADIAN PATENT

SURGICAL DRESSINGS

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20 Claims - No drawing

This invention comprises an improved surgical dressing having non-stick properties, particularly useful as a wound dressing or wound dressing facing.

10 Fabrics woven from polythene filaments or strands have been used as a wound dressing facing, replacing the normal cotton gauze, and they have had the advantage of making use of the inert properties of polythene and of its property of not adhering to wound surfaces. This is particularly important in the case of dressings used on burns. However, there are certain disadvantages to the use of such polythene fabrics in that the pore size is relatively large so that the serous exudate may seep back to the wound after having passed through the fabric to the absorbent backing. Also the polythene fabric tends to leave pattern marks on the healing wound. A further disadvantage is the relatively high cost.

20 The present invention makes use of the advantageous properties of polythene and like film-forming material as a surgical dressing material whilst avoiding the aforesaid drawbacks. The surface of the dressing material may be made substantially free from projecting fibres.

30 Although the polythene may be applied to the porous, fibrous fabric by a "hot melt" process there are practical difficulties in performing the process satisfactorily so as to leave the necessary porosity in the finished product. Accordingly it is preferred to use an aqueous emulsion of polythene. Thus the fibrous fabric may be impregnated with an aqueous emulsion of polythene,

water being then removed to leave the dispersed particulate polythene on the fabric, and the fabric afterwards being hot pressed. The hot pressing step ensures a smooth fibre-free surface on both sides of the fabric.

The hot pressing may be effected by running the fabric between smooth heated metal rollers whereby a local temperature of approximately 100°C. is achieved.

10 The fibrous fabric may be an absorbent paper, a carded web of fibres, a woven fabric, or a non-woven fabric. In the case of the non-woven fabric the fabric may consist of a carded web of the textile fibres reinforced by a bonding agent applied so as to leave the fabric porous. In this respect it is preferred to use an intermittently bonded web of fibres wherein the bonding medium is applied along lines or over spaced areas disposed so as to reinforce and hold together the fibres of the web. An example of such fabric is that described in British specification No. 468,529.

20 After impregnation of the fibrous web or fabric, partial drying may be effected by passing the material over a stack of steam heated rolls and then through a bath containing hot water to wash off as completely as possible, the emulsifying agent used in making the polythene emulsion. This is followed by complete drying over a further stack of steam heated rolls. As already stated, the fabric may then be passed through a hot calender whereby a smooth surface free from projecting fibres is obtained.

An alternative procedure for obtaining a smooth fibre-free surface, which is particularly useful when the material is to be sterilized before use, employs a film

of regenerated cellulose or other flexible film capable of adhering slightly to the face of the fabric upon the application of heat. In this procedure, the fabric, after washing and drying, may be interleaved with a single ply of an inert flexible film and rolled under tension upon a core. Long lengths of the fabric can be conveniently rolled up in this way. The roll is then heated sufficiently to cause fusion of the polythene deposited on the fabric. Heating may be effected in dry hot air or in steam under pressure. On cooling, the polythene treated fabric has a smooth fibre-free surface on both sides, the interleaving film being lightly anchored to one side as a protective coating. This composite fabric may be sterilized by customary means and the interleaving film be peeled off prior to use.

According to a further feature of the invention there is produced a dressing having a facing of fabric, treated with polythene or the like as aforesaid, and having a backing of absorbent fibrous material. This may be effected by plying the washed and dried impregnated fabric with a sheet of non-woven, or woven fabric, or a carded web of absorbent fibres or a sheet of absorbent paper, and then passing the composite material through smooth heated metal rolls, before barching into rolls. The resultant fabric has one surface smooth and fibre-free and the other absorbent and fibrous. The composite material may be wound upon a core under tension to give a roll which is then heated sufficiently to produce the necessary fusion, as hereinbefore indicated. After cooling the fabric has one side absorbent and fibrous and the other side has

a smooth fibre-free surface of polythene or the like temporarily protected by the interleaving film.

The amount of polythene or the like applied to the fabric in order to produce the required properties in the non-stick dressing may vary within quite wide limits. In the case of polythene itself, less than 50% on the fabric, based on the weight of the initial fabric, will generally be insufficient to ensure a fibre-free surface. On the other hand above 600% of polythene, on the same weight basis, the fabric will generally be insufficiently permeable to serous exudate. The preferred amount of polythene is about 100 - 150% by weight based on the weight of the initial fabric.

EXAMPLES

The following examples are given to illustrate the invention and not to limit its scope.

EXAMPLE I

An intermittently bonded non-woven fabric, e.g. according to British specification No. 468,529, or as sold under the registered trade mark "MASSLINN", weighing 210 grains per square yard is impregnated with a 30% solid (by weight) polythene emulsion, so that 300 grains of solid polythene are retained by the fabric. The fabric is partially dried over a stack of steam heated rolls, washed in hot water, and then dried completely over a further stack of steam heated rolls. The washed and dried material is interleaved with regenerated cellulose film and rolled under tension so that 50 yards of material are in the roll. The roll is heated at 120° C. in dry air for 30 minutes and allowed to cool. The resultant fabric has

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a smooth fibre-free surface on both sides, one side being protected by the regenerated cellulose film. This fabric is particularly effective as a non-stick wound dressing.

EXAMPLE II

The washed and dried polythene impregnated non-woven fabric produced according to Example 1 is plied together with a sheet of the same initial non-woven fabric on the one side and interleaved on the other smooth side, with a sheet of regenerated cellulose film. The composite sheet is rolled upon a core under tension and heated in steam at 25 lbs. per square inch pressure for 30 minutes. The resultant fabric has a smooth fibre-free surface protected by the regenerated cellulose film and an absorbent fibrous backing. This fabric is also effective as a non-stick dressing.

The fabric produced according to both these examples is dimensionally stable on sterilization in an autoclave, due to the support given by the regenerated cellulose film.

SUPPLEMENTARY DISCLOSURE

This is a Supplementary Disclosure based on application S.N. 669,864, filed October 12th, 1954.

In application S.N. 669,864 there is disclosed that the properties of polyethylene and like film-forming material can be used to advantage in surgical dressing material.

10 It has been found that among other film-forming materials which can be used besides polyethylene there may be mentioned vinyl polymers, for example, polyvinyl chloride and polyvinyl acetate, or co-polymers of vinyl chloride and vinyl acetate, and polyesters and polyamides having a melting point below 150°C.

The nature of the film-forming material and the manner of treatment of the fabric therewith should be such that the film-forming material is produced on the fabric in a particulate form as distinct from a continuous film.

20 The desired advantages of minimum tendency to stick to the wound consistent with permeability are made possible by the presence of the particulate plastic film-forming material in the surgical dressing of the invention.

In order to ensure that the dressing is inert to blood and serum a silicone resin may be applied to the fabric. The latter may be applied in admixture with the film-forming material.

The treatment is preferably an impregnation of the fabric with the film-forming material in aqueous emulsion or dispersion, following by drying and fusing of the material in situ.

30 The surface of the dressing material, especially that surface to contact the wound or lesion, is preferably made substantially free from projecting fibres.

Although the film-forming resin with silicone resin may be applied to the fabric by a "hot melt" process there are practical difficulties in performing the process satisfactorily so as to leave the necessary porosity in the finished product. Accordingly it is preferred to use an aqueous emulsion. Thus the fibrous fabric may be impregnated with the emulsion; water being then removed and the fabric afterwards being hot pressed. The hot pressing step ensures a smooth fibre-free surface.

10 The hot pressing may be effected by running the fabric between smooth heated metal rollers whereby a local temperature of approximately 100°C is achieved.

The process for preparing the surgical dressing with the film-forming composition of the present Supplementary Disclosure is the same as in application S.N. 669,864.

Examples.

The following examples are given to illustrate the use of other film-forming material and should not be considered as limiting the invention in any sense.

20 Example 3

A non-woven cellulosic fabric of the kind mentioned in Example 1 is impregnated with an aqueous dispersion of a mixture of polythene and a silicone resin so that 150 grains of polythene and 5 grains of silicone resin are applied per square yard of fabric. The polythene-silicone mixture can be Drisil 148 which is used by Midland Silicones Limited to identify their brand of textile finishing composition answering this description. The fabric is partially dried over a stack of steam-heated rolls, washed in hot water, and
30 then dried over a further stack of steam-heated rolls. The washed and dried material is interleaved with regenerated cellulose film and rolled under tension so that 100 yards of

material are in the roll. The roll is heated at 120°C in dry air for 30 minutes and allowed to cool. The resultant fabric has a smooth fibre-free surface on both sides, one side being temporarily protected by the regenerated cellulose film.

Example 4

A non-woven fabric of the kind mentioned in Example 1 is impregnated with an aqueous dispersion of polyvinyl chloride so that 300 grains of polyvinyl chloride solids are applied per square yard of fabric. A suitable commercial aqueous dispersion of polyvinyl chloride is known as Corvic, marketed by Imperial Chemical Industries Limited. The fabric is dried at 105°C and interleaved with a sheet of regenerated cellulose film on one face and a sheet of the initial non-woven fabric on the other face. The three ply laminate is hot pressed by passing through smooth metal rollers heated to a temperature of about 120°C so that the particles of polyvinyl chloride are fused. The resultant fabric has a smooth fibre-free surface temporarily protected by the cellulose film and an absorbent fibrous backing. This fabric is also effective as a non-stick dressing.

Example 5

A non-woven fabric as used in Example 1 is impregnated with an aqueous dispersion of polyvinyl acetate which is unplasticised so that about 300 grains of polyvinyl acetate are applied per square yard of fabric. The fabric is dried at 105°C and interleaved with a sheet of regenerated cellulose film on one face and a sheet of the initial non-woven fabric on the other face. The three-ply laminate is hot pressed by passing through smooth metal rollers heated to a temperature of about 120°C so that the particles of polyvinyl acetate are fused. The resultant fabric has a

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smooth fibre-free surface temporarily protected by the cellulose film and an absorbent fibrous backing. This fabric is also effective as a non-stick dressing.

By proceeding in the same manner polyamide and polyester resins having a melting point below 150°C can also be used as the film-forming resin.

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The fabric produced according to these examples is dimensionally stable on sterilization in an autoclave, due to the support given by the regenerated cellulose film.

As an example of using the dressing, a six inch square of the fabric is applied to the wound after removing the cellulose film. Two plies of semi-absorbent tissue paper (D.C. weight 8 lbs.) are placed over the square of fabric, followed by about 250 grains of absorbent cotton wool. The complete dressing is held in place by a bandage preferably of the self-conforming type.

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The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows -

1. A surgical dressing comprising a porous fibrous fabric impregnated with polythene, said polythene being in particulate form and said fabric thereby being foraminous and permeable to fluids.
2. A surgical dressing comprising a porous fibrous fabric impregnated with polythene, said polythene being in particulate form and binding together said fibres, and said fabric thereby being foraminous and substantially free of fibres projecting from the surface of said fabric.
3. A surgical dressing comprising a porous fibrous fabric one surface of which is impregnated with polythene, said surface being adapted to contact the body, said polythene being in particulate form and binding together portions of said fibres and said surface thereby being foraminous, permeable to body fluids and substantially free of fibres projecting from said surface, the surface of said fabric opposite said first-mentioned surface being absorbent and substantially free of said polythene, said dressing in wound-contacting position being capable of transmitting body fluids from said first-mentioned surface toward said opposite surface.
4. A surgical dressing as defined in Claim 2 or 3, wherein the fibrous fabric is made from cellulose fibres.
5. A surgical dressing as defined in Claim 2 or 3, wherein the fibrous fabric is of nonwoven textile fibres.
6. The method of making a surgical dressing having non-stick properties which comprises impregnating a fibrous fabric with an aqueous emulsion of polythene, drying said impregnated fabric and thereafter compressing said fabric while heating.

7. The method of making a surgical dressing having non-stick properties which comprises impregnating a cellulosic fibrous nonwoven fabric with an aqueous emulsion of polythene, drying said impregnated fabric, laminating the fabric with an inert flexible continuous film with pressure and heating, said film being adapted to be readily peeled from said fabric prior to using the dressing.

8. The method according to Claim 7 in which said lamination is effected by rolling up under tension said fabric and said film and heating said roll sufficiently to cause adhesion of the fabric and film.

9. The method of making a surgical dressing having non-stick properties which comprises impregnating a fibrous nonwoven cellulosic fabric with an aqueous emulsion of polythene, drying said impregnated fabric, laminating said fabric with a sheet of absorbent cellulosic fibrous material substantially free of said plastic material and heating said fabric under pressure to bind together portions of said fibres and produce a surface substantially free of fibres projecting therefrom while still retaining the permeability of said surface to body fluids.

10. The method of making a surgical dressing having non-stick properties which comprises impregnating a fibrous nonwoven cellulosic fabric with an aqueous emulsion of polythene, drying said impregnated fabric, laminating said fabric on one side with a sheet of absorbent cellulosic nonwoven fibrous material substantially free of said plastic material and on the other side with an inert flexible continuous film, and heating said fabric under pressure to bind together portions of said fibres and produce a surface adjacent said film substantially free of fibers projecting therefrom while still retaining the permeability of said surface to body fluids.

CLAIM SUPPORTED BY THE SUPPLEMENTARY DISCLOSURE

11. A surgical dressing comprising a porous fibrous fabric impregnated with inert film-forming plastic material, said plastic material being in particulate form and said fabric thereby being foraminous and permeable to fluids.
12. A surgical dressing comprising a porous fibrous fabric impregnated with inert film-forming plastic material and a silicone resin, said plastic material being in particulate form, and said fabric thereby being foraminous and permeable to fluids.
13. A surgical dressing comprising a porous fibrous fabric impregnated with inert film-forming plastic material, said plastic material being in particulate form, and binding together portions of said fibres, and said fabric thereby being foraminous and substantially free of fibres projecting from the surface of said fabric.
14. A surgical dressing according to claim 11, 12 or 13, in which the fibrous fabric is made from cellulosic fibres.
15. A surgical dressing according to claim 11, 12 or 13, in which the fibrous fabric is of nonwoven textile fibres.
16. A surgical dressing comprising a porous fibrous fabric one surface of which is impregnated with inert film-forming plastic material, said surface being adapted to contact the body, said plastic material being in particulate form and binding together portions of said fibres and said surface thereby being foraminous, permeable to body fluids and substantially free of fibres projecting from said surface, the surface of said fabric opposite said first-mentioned surface being absorbent and substantially free of said plastic material, said dressing in ⁱⁿwould-contacting position being capable of transmitting body fluids from said first-mentioned surface toward said opposite surface.

17. The method of making a surgical dressing having non-stick properties which comprises impregnating a fibrous fabric with an aqueous emulsion of inert film-forming plastic material, drying said impregnated fabric and thereafter compressing said fabric while heating.

18. The method of making a surgical dressing having non-stick properties which comprises impregnating a fibrous fabric with an aqueous emulsion of inert film-forming plastic material and a silicone resin, drying said impregnated fabric and thereafter compressing said fabric while heating.

19. The method of making a surgical dressing having non-stick properties which comprises impregnating a cellulosic fibrous nonwoven fabric with an aqueous emulsion of inert film-forming plastic material, drying said impregnated fabric, laminating the fabric with an inert flexible continuous film with pressure and heating, said film being adapted to be readily peeled from said fabric prior to using the dressing.

20. The method according to Claim 19 in which said lamination is effected by rolling up under tension said fabric and said film and heating said roll sufficiently to cause adhesion of the fabric and film.